



## **Light-Duty Vehicle Operator Survey: Summary of January 1997 Data Collection Period**

### **Introduction**

The primary objective of the light-duty vehicle operator survey is to collect performance and driveability data on alternative fuel vehicles (AFVs) and comparable gasoline vehicles. The data are collected through telephone surveys conducted by Dwights Energydata for the U.S. Department of Energy's (DOE) National Renewable Energy Laboratory (NREL). This report summarizes the results from the survey conducted in January 1997. Dwights Energydata supplied the data to NREL, where the information was analyzed.

Data were collected on compressed natural gas (CNG) vehicles, flexible-fuel ethanol (E85) vehicles, flexible-fuel methanol (M85) vehicles, and similar gasoline vehicles from the original equipment manufacturers (OEM). Data were also collected from gasoline vehicles that have been converted to operate on CNG (most are bi-fuel after conversion). The survey was conducted with federal government fleet managers and drivers who operate AFVs or gasoline vehicles as a regular part of their work assignments in various cities and states across the country. Most of the AFVs and gasoline vehicles are leased from the General Services Administration (GSA), except for the vehicles converted to operate on CNG. The converted vehicles evaluated in this survey were owned by the federal agency that operates the vehicles.

During this survey period, we attempted to replicate the surveys conducted in January 1996, by contacting the same fleet managers and the same drivers. The interviewer was somewhat successful in contacting fleet managers who participated in the January survey. Thirty-two of the fifty fleet managers contacted in 1996 were also interviewed in January 1997. However, the rate of repeat surveys with drivers was fairly low (~16%), with the interviewer only able to contact 41 out of the 250 drivers surveyed in January 1996. Turnover appears to be high among the personnel using AFVs in the federal fleet. As in previous survey quarters, the drivers contacted are not necessarily associated with the fleet managers who participated in the survey during this period. The fleet and driver survey results from this survey period are summarized in the sections that follow. The repeat surveys will be compared and the results documented in a separate report.

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*NREL is a national laboratory of the U.S. Department of Energy (DOE). This survey was conducted for DOE by NREL's Center for Transportation Technologies and Systems.*

## Fleet Manager Survey Results

The fleet manager survey was designed to obtain perspectives on AFV performance and maintenance in comparison to similar gasoline vehicles. During this survey period, fleet managers in 21 different states were contacted. Each fleet manager was asked to identify the primary AFV type in his/her fleet. Several fleet managers operate more than one model of AFV, or operate vehicles on more than one alternative fuel. Fleet managers contacted were categorized as follows:

Primary AFV Type	Number of fleet managers	Fleet managers operating more than one vehicle model on primary alternative fuel	Fleet managers operating vehicles on other alternative fuels
CNG-OEM <sup>1</sup>	16	6	1 (M85)
CNG-QVM <sup>2</sup>	6	3	2 (M85)
CNG-CON <sup>3</sup>	6	5	1 (M85)
E85	23	5	6 (5-M85 & 2-CNG)*
M85	24	4	5 (CNG)
<b>Total</b>	<b>75</b>	<b>23</b>	<b>15</b>

<sup>1</sup> Original equipment manufacturer

<sup>2</sup> Qualified vehicle modifier

<sup>3</sup> Aftermarket conversion (see Appendix A for definitions of OEM, QVM, and conversion)

\* One fleet had M85, E85, and CNG vehicles

The following table summarizes the number of vehicles in the fleets represented by these fleet managers.

Fleet size (no. of vehicles)	All LDVs		AFVs in Fleet	
	No.	%	No.	%
10 or less	34	45.3	55	73
11 to 50	12	16	9	12
51 to 100	10	13.3	5	7
100-250	7	9.3	4	5
250-500	7	9.3	0	0
> 500	5	6.7	2	3

When asked if drivers of their fleet vehicles specifically requested AFVs, fleet managers responded as follows:

Response	Fleet managers responding this way	
	No.	%
Don't want AFV	18	24
Want AFV	14	19
Neutral	38	51
Haven't noticed	5	7

Common reasons fleet managers cited for drivers not wanting or being neutral about using AFVs included lack of vehicle range (primarily dedicated CNG vehicles), and lack of convenient refueling or no alternative fuel available (most common for alcohol vehicles).

Fleet managers were asked if drivers of their fleet vehicles tend to report more vehicle performance complaints about AFVs or gasoline vehicles. Sixty-one of the 75 fleet managers (81%) indicated no difference in the number of performance complaints received about AFVs and gasoline vehicles. Thirteen fleet managers (17%) reported receiving more complaints about AFVs, and the remaining fleet manager reported receiving more complaints about gasoline vehicles.

When asked about the specific performance complaints they had received from their AFV drivers over the last month, fleet managers reported the following:

Complaints about AFVs	Fleet managers who received complaints	
	No.	%
Poor idle	2	2.7
Lack of power	2	2.7
Check engine light on	3	4

Fleet managers were also asked about driver reports of stalling, vehicles being hard to start, hesitation, and engine ping, but none reported receiving these complaints. Fleet managers reported receiving very few performance complaints from drivers of AFVs in their fleet.

The fleet managers were next questioned about their AFV fueling practices. Forty of the 75 fleet managers (53%) reported that there was *not* an alternative fuel station reasonably close to them. Thirty of the 75 fleet managers (40%) reported receiving complaints from their drivers about alternative fuel stations being hard to find (i.e., there are not enough stations). When asked if the AFVs in their fleet were usually fueled with an alternative fuel or gasoline, the fleet managers responded as follows:

Fuel usually used in AFVs	All fleet managers responding this way		Responses of fleet managers whose primary AFV type is:									
			CNG						E85		M85	
			OEM		QVM		CON					
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Alternative fuel	44	59	16	100	5	83	4	67	15	65	4	7
Gasoline	30	41	0	0	1	17	2	33	8	35	19	83
Total	74	100	16	100	6	100	6	100	23	100	23	100

Fifty-nine percent of fleet managers reported their AFVs are being refueled most of the time with an alternative fuel. Flexible-fuel vehicles designed to use M85 are the least likely to be regularly fueled with an alternative fuel. Only 17% of fleet managers whose primary AFV type is M85 indicated their AFVs use alternative fuel most of the time.

Fleet managers were also asked questions about vehicle maintenance. Most of the fleet managers (91%) indicated that the AFVs did not required different or additional *scheduled* maintenance. M85 was the primary AFV type operated by six out of the seven fleet managers who reported differences in scheduled maintenance. More frequent oil changes, requiring a special oil, represented the difference in scheduled maintenance.

The fleet managers were also asked about the frequency and types of *unscheduled* maintenance. Again, most (97%) experienced no difference in the types or frequency of unscheduled maintenance for AFVs.

The last maintenance question addressed AFV versus gasoline vehicle downtime. Ninety-six percent of the respondents indicated that vehicle downtime is about the same for AFVs and gasoline vehicles in their fleet (all reported an average downtime of less than one day per month per vehicle). The three fleet managers who indicated that downtime differed reported that AFVs experienced more downtime.

## **Driver Survey Results**

The driver surveys concentrate on the operator's subjective assessment of the performance of different AFVs compared to similar gasoline vehicles. The drivers were asked several questions to determine how much driving they do at work and whether they could identify the vehicle they drive at work as an AFV. The goal was to survey 50 drivers of each of the following types of AFVs fueled with each of the following fuels: CNG-OEM/QVM, CNG conversions, E85 flexible-fuel, and M85 flexible-fuel, as well as 50 drivers of similar gasoline vehicles.

### ***Vehicle and Driver Information***

The following table summarizes the number of drivers surveyed by vehicle type:

Vehicle type	Number of drivers surveyed	% of driver surveys
CNG-OEM	35	14
CNG-QVM	15	6
CNG-CON	50	20
E85	50	20
Gasoline	50	20
M85	50	20
<b>Total</b>	<b>250</b>	<b>100</b>

During this survey period, CNG vehicles fell into two primary categories, OEMs and CONs. The OEM vehicles were further categorized as OEM and QVM (see Appendix A for more details). The results of the CNG vehicle driver surveys are presented as OEM, QVM, and CON throughout this section. The vehicles included in the survey and their locations are summarized in Appendix B.

Ninety percent of the drivers indicated that they are assigned the vehicles they drive, and have no choice of vehicle. The amount of time the drivers had driven their vehicles, as well as their driving characteristics, is indicated below:

Time driven	Drivers		Miles driven in typical week	Drivers		Highway driving (%)	Drivers	
	No.	%		No.	%		No.	%
6 months or less	18	7	less than 25	26	10	less than 10	81	32
6 months to 1 year	54	22	26 to 50	41	16	11 to 25	35	14
1 to 2 years	89	36	51 to 100	49	20	26 to 50	37	15
2 to 3 years	58	23	101 to 200	54	22	51 to 75	37	15
more than 3 years	31	12	more than 200	80	32	76 to 100	60	24

### ***Refueling Information***

During this survey period, 89% of drivers indicated that they refuel their own vehicles. AFV drivers were asked what percentage of the time they use an alternative fuel in the vehicles. Their answers are summarized in the following table:

Percentage of time alternative fuel used	Drivers of vehicles fueled by:											
	Total		CNG						Ethanol		Methanol	
			OEM		QVM		CON					
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
0 (gasoline only)	8	4	-	-	1	6.7	2	4	0	0	5	10
5 to 25	22	11	-	-	1	6.7	0	0	0	0	21	42
26 to 50	9	4.5	-	-	1	6.7	0	0	0	0	8	16
51 to 75	4	2	-	-	0	0	1	2	3	6	0	0
76 to 99	6	3	-	-	0	0	0	0	4	8	2	4
100	151	75.5	35	100	12	80	47	94	43	86	14	28

More than 75% of these drivers said their vehicle operates 100% of the time on an alternative fuel. Twenty-three percent of the drivers exclusively using alternative fuel operate dedicated CNG vehicles. Drivers of M85 flexible-fuel vehicles were most likely to use gasoline (instead of M85) in their vehicles (68% of drivers used M85 less than 50% of the time).

When asked whether an alternative fuel station was within a reasonable distance from where most of their driving was done, nearly 74% of the drivers responded “yes.” Most of the drivers (~89%) indicated a fueling station had to be less than a half mile away to be convenient. The following table summarizes responses from drivers of AFVs on some attributes of alternative fuel refueling stations:

Fueling Station Attribute	Acceptable		Marginal		Not Acceptable		Total	
	No.	(%)	No.	(%)	No.	(%)	No.	(%)
Accessibility	174	90	14	7	6	3	194	100
Hours of operation	183	94	7	4	4	2	194	100
Ease of filling	171	88	20	10	3	2	194	100

Most (90%) drivers had no personal concerns about refueling their AFV. Those who reported concerns generally operate CNG vehicles (18 of 20 reports), and more than 50% of the reported concerns related to vehicle safety.

### ***Vehicle Performance Information***

Drivers were asked for an overall evaluation of how their vehicles perform. The results are tabulated below.

Vehicle performance rating	Drivers of vehicles fueled by:													
	All		CNG						E85		Gasoline		M85	
			OEM		QVM		CON							
	No.	%	No.	%	No.	%	No.	%	No.	%	No	%	No.	%
Excellent	67	27	12	34	3	20	12	24	16	32	19	38	5	11
Very good	92	38	14	40	2	13	12	24	23	46	23	46	18	41
Average	55	22	6	17	5	33	17	34	9	18	5	10	13	30
Fair	16	7	0	0	3	20	4	8	2	4	2	4	5	11
Poor	14	6	3	9	2	13	5	10	0	0	1	2	3	7

Eighty-seven percent of drivers rated their vehicle performance as average or better. The remaining 13% rated vehicle performance as fair or poor. More than 56% of the vehicles rated fair or poor were fueled by CNG. When drivers were asked how an AFV compares to similar gasoline vehicles, or vice versa, they responded as follows:

Vehicle comparison	AFV driver (AFV compared to gasoline)		Gasoline vehicle driver (gasoline compared to AFV)	
	No.	%	No.	%
Better	32	17	15	68
About the same	106	55	6	27
Not as well	54	28	1	5

Most (72%) AFV drivers said their vehicles were the same or better than gasoline vehicles. Of AFV drivers rating their vehicle performance as worse than a similar gasoline vehicle, 61% (33 out of 54) drove CNG vehicles. When asked why they felt the AFVs performed worse, limited vehicle range and lack of power were common responses. It is important to note that more than half the gasoline vehicle drivers surveyed (56% or 28 of 50) did not provide an answer to this question. In general, the non-responding drivers of AFVs had only operated their vehicle on gasoline and the non-responding gasoline vehicle drivers had never driven an AFV, so these drivers felt they had no basis for comparison.

Next, drivers were asked whether they had experienced any specific performance problems with their vehicles in the last month. The “yes” responses are summarized below:

Performance problem	Number of reports from drivers of vehicles fueled by:					
	CNG			E85	Gasoline	M85
	OEM	QVM	CON			
Hard to start	3	1	2	1	-	-
Stall in traffic	-	-	-	-	-	1
Poor idle	-	-	-	-	1	-
Hesitation	-	-	1	-	-	1
Lack of power	1	-	-	-	-	-
Check engine light	-	-	1	-	-	-
<b>Total</b>	4	1	4	1	1	2

Overall, few performance problems were reported. Drivers were also asked if their vehicles stalled after starting or experienced engine ping—neither problem was reported.

The next table summarizes how drivers rate their vehicle acceleration:

Vehicle acceleration rating	Drivers of vehicles fueled by:													
	All		CNG						E85		Gasoline		M85	
			OEM		QVM		CON							
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Excellent	53	22	11	31	2	14	12	24	13	26	14	28	1	2
Very good	68	28	9	26	0	0	8	16	21	42	22	44	8	18
Average	84	34	11	31	4	29	18	36	14	28	9	18	28	64
Fair	26	11	3	9	6	43	7	14	1	2	3	6	6	14
Poor	12	5	1	3	2	14	5	10	1	2	2	4	1	2

Most drivers (84%) rated their vehicle acceleration as average or better. At least one driver of each fuel type vehicle rated their vehicle acceleration as poor; CNG conversions had the most poor acceleration ratings with five.

The final performance question asked of drivers was how satisfied they were with the vehicle range on a tank of fuel. The results are tabulated below:



Vehicle range rating	Drivers of vehicles fueled by:													
	All		CNG						E85		Gasoline		M85	
			OEM		QVM		CON							
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Acceptable	182	73	12	34	8	53	33	66	39	78	49	98	41	82
Marginal	41	16	7	20	4	27	12	24	10	20	1	2	7	14
Not acceptable	27	11	16	46	3	20	5	10	1	2	0	0	2	4

In general, drivers of CNG vehicles were the least satisfied with driving range; 89% of reports of range not being acceptable were from drivers of CNG-fueled vehicles. Most drivers of E85, M85, and gasoline vehicles were satisfied with their driving range.

Drivers were asked for their overall satisfaction level with the vehicle they drive at work. They were asked to think about performance, convenience, and any other factors that influenced them while driving. Their answers are summarized below:

Overall vehicle satisfaction level	Drivers of vehicles fueled by:													
	All		CNG						E85		Gasoline		M85	
			OEM		QVM		CON							
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Very satisfied	106	44	15	43	5	36	22	44	30	60	24	48	10	23
Leaning toward satisfied	63	26	7	20	2	14	5	10	10	20	20	40	19	43
Neutral	41	17	2	6	4	29	16	32	7	14	4	8	8	18
Leaning toward dissatisfied	18	7	5	14	2	14	3	6	3	6	1	2	4	9
Dissatisfied	15	6	17		1	7	4	8	0	0	1	2	3	7

Most (~70%) drivers were satisfied or very satisfied with their vehicles. The dissatisfied drivers tended to operate CNG or M85 vehicles. The most common negative responses were associated with poor mileage or range of the CNG-OEM vehicles and not enough refueling stations for all AFVs.

The AFV drivers were asked if they would recommend a vehicle that operates on an alternative fuel to someone else. The results are summarized below:

Recommend AFV	Drivers of vehicles fueled by:											
	All AFVs		CNG						E85		M85	
			OEM		QVM		CON					
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Yes	126	63	20	57	8	53	38	76	36	72	24	48
No	74	37	15	43	7	47	12	24	14	28	26	52

More than 60% of AFV drivers would recommend an AFV to other drivers. Drivers of AFVs who would not recommend them were asked to identify the single most important reason. The most common answers from drivers of CNG vehicles was lack of vehicle range, followed by lack of fueling stations and safety concerns. For drivers of alcohol vehicles (E85 and M85), the most common reason was lack of fuel availability.

### Summary

The fourth-quarter survey round was completed with responses from 75 fleet managers and 250 drivers of federal fleet vehicles. The major survey findings were:

#### *From fleet managers:*

- Seventy-three percent of fleet managers interviewed operate 10 or fewer AFVs in their fleets.
- Lack of range and convenient refueling facilities are common reasons fleet managers cite for their drivers not wanting AFVs.
- Eighty-one percent of fleet managers indicated they received the same number of performance complaints about AFVs and gasoline vehicles. No specific performance complaint occurs more frequently.
- Fifty-nine percent of fleet managers indicate their AFVs refuel with alternative fuel most of the time.
- Most fleet managers (> 97%) reported no difference in types or frequency of unscheduled maintenance, with vehicle downtime averaging less than one day each month.

#### *From drivers:*

- Drivers generally have more than six months experience operating their AFV. They typically drive more than 50 miles per week, with less than half their driving done on the highway.

- More than 75% of AFV drivers indicated their vehicles operated 100% of the time on alternative fuel. Drivers of M85 flexible-fuel vehicles were the least likely to refuel regularly with the alternative fuel.
- More than 70% of AFV drivers indicated an alternative fuel station was within a reasonable distance. About 89% percent of drivers indicated a fueling station had to be within a half mile to be convenient.
- Eighty-seven percent of AFV and gasoline drivers rated overall vehicle performance average or better.
- Relatively few performance complaints were reported during this survey period. Thirteen complaints were reported by the 250 drivers interviewed.
- Drivers of CNG vehicles were the least satisfied with driving range. Most (24 out of 27) not acceptable vehicle range ratings were received from drivers of CNG AFVs.
- Seventy percent of drivers were satisfied or very satisfied with their vehicle.
- Sixty-three percent of AFV drivers would recommend AFVs to others. The most common reasons for *not* recommending AFVs were the lack of refueling stations for all AFV types, and lack of range for CNG vehicles.

## **Appendix A. AFV Options Description**

Three principal types of AFVs are available: original equipment manufacturer (OEM) vehicles, qualified vehicle modifier (QVM) vehicles, and aftermarket conversions (CON). The OEM vehicles are designed and built by the OEMs (such as Chrysler, Ford, or General Motors). All of the alcohol vehicles and some CNG vehicles fall into this category. OEM AFVs are designed with the engine, suspension, and chassis upgrades to result in optimum performance and durability. These vehicles have single comprehensive warranties that cover all components, including those that are specific to alternative fuels.

The QVM vehicles are similar to the OEMs except the manufacturer has joined with a “qualified” conversion company to complete the final assembly that enables the vehicle to operate on an alternative fuel. A qualified conversion company must meet a variety of stringent standards set forth by the OEM, including strict parts quality requirements. QVMs generally have the same upgrades to the engine and chassis as the OEMs, meet the same safety and emissions standards, and offer a single comprehensive warranty. The QVMs, which are currently available in CNG and LPG models, may be dedicated or bi-fuel, depending on owner preference.

Aftermarket conversions are conversions of gasoline vehicles by an independent company after the vehicle has been purchased. The converted vehicles do not have the engine and chassis upgrades offered in the OEM and QVM vehicles. The conversion company generally provides a separate warranty from the OEM and the OEM warranty will not cover problems or damages resulting from installation or operation of the vehicle on the alternative fuel. Available aftermarket conversions enable operation on CNG or LPG, and may be bi-fuel or dedicated, depending on owner preference. CNG vehicles are identified as OEM, QVM, or CON where appropriate throughout this summary.

Appendix B. Surveyed Drivers' Vehicle and Location					CNG-OEM	Caravan	1994	Kennedy Space Center	FL
Veh. Type	Model	Year	City	ST	CNG-OEM	Caravan	1994	Kennedy Space Center	FL
CNG-CON	Dodge Van	1990	Camp Pendelton	CA	CNG-OEM	Caravan	1995	Kennedy Space Center	FL
CNG-CON	Dodge Van	1992	Camp Pendelton	CA	CNG-OEM	Ram Van	1993	Kennedy Space Center	FL
CNG-CON	Ford Pickup	1992	Camp Pendelton	CA	CNG-OEM	Ram Van	1995	Kennedy Space Center	FL
CNG-CON	Ford Pickup	1993	Camp Pendelton	CA	CNG-OEM	Caravan	1994	Kennedy Space Ctr.	FL
CNG-CON	Ford Pickup	1994	Camp Pendelton	CA	CNG-OEM	Ram Van	1994	Tampa	FL
CNG-CON	Ford Van	1995	Camp Pendelton	CA	CNG-OEM	Ram Van	1994	Titusville	FL
CNG-CON	Ram Van	1993	Camp Pendelton	CA	CNG-OEM	Ram Pickup	1995	Atlanta	GA
CNG-CON	Ram Van	1995	Camp Pendelton	CA	CNG-OEM	Chevy Pickup	1989	RAFB	GA
CNG-CON	Ram Van	1996	Camp Pendelton	CA	CNG-OEM	Ram Van	1992	Robbins AFB	GA
CNG-CON	Chevy Pickup	1993	Camp Pendleton	CA	CNG-OEM	Caravan	1994	Argonne	IL
CNG-CON	Chevy Pickup	1995	Camp Pendleton	CA	CNG-OEM	Caravan	1994	Argonne	IL
CNG-CON	Chevy Pickup	1995	Camp Pendleton	CA	CNG-OEM	Caravan	1994	Billings	MT
CNG-CON	Chevy Pickup	1996	Camp Pendleton	CA	CNG-OEM	Caravan	1995	Charlotte	NC
CNG-CON	Dodge Pickup	1995	Camp Pendleton	CA	CNG-OEM	Ram Pickup	1995	Charlotte	NC
CNG-CON	Ford Pickup	1991	Camp Pendleton	CA	CNG-OEM	Ram Van		Charlotte	NC
CNG-CON	Ram Van	1992	Camp Pendleton	CA	CNG-OEM	Caravan	1994	Research Triangle Park	NC
CNG-CON	Chevy Pickup	1995	Edwards AFB	CA	CNG-OEM	Caravan	1994	Los Alamos	NM
CNG-CON	Chevy Pickup	1993	Pasadena	CA	CNG-OEM	Ram Van	1995	Reno	NV
CNG-CON	Chevy Pickup	1994	Putman	CA	CNG-OEM	Ram Van	1996	Reno	NV
CNG-CON	Ford Pickup	1989	Santa Ana	CA	CNG-OEM	Caravan	1995	Amarillo	TX
CNG-CON	Ford Pickup	1993	Santa Ana	CA	CNG-OEM	Ram Van	1994	Austin	TX
CNG-CON	Ranger	1989	Santa Ana	CA	CNG-QVM	Ford Pickup	1996	Putman	CA
CNG-CON	Ranger	1993	Santa Ana	CA	CNG-QVM	F150	1996	Kennedy Space Center	FL
CNG-CON	Ranger	1993	Santa Ana	CA	CNG-QVM	Econoline	1996	West Palm Beach	FL
CNG-CON	Ranger	1994	Santa Ana	CA	CNG-QVM	Ford Pickup	1995	Ellenwood	GA
CNG-CON	Chevy Pickup	1994	Denver	CO	CNG-QVM	Ford Pickup	1995	Ellenwood	GA
CNG-CON	Spirit	1994	Denver	CO	CNG-QVM	Contour	1996	Robbins AFB	GA
CNG-CON	Dodge Van	1991	Golden	CO	CNG-QVM	F150	1996	Argonne	IL
CNG-CON	Crown Victoria	1993	Washington	DC	CNG-QVM	Contour	1997	Philadelphia	PA
CNG-CON	Eagle	1984	Washington	DC	CNG-QVM	Ford Pickup	1995	Fort Hood	TX
CNG-CON	Chevy Pickup	1994	Dobbins AFB	GA	CNG-QVM	Ford Pickup	1995	Fort Hood	TX
CNG-CON	Ram Van	1994	RAFB	GA	CNG-QVM	Ford Pickup	1995	Fort Hood	TX
CNG-CON	Chevy Pickup	1988	Robbins AFB	GA	CNG-QVM	Ford Pickup	1996	Fort Hood	TX
CNG-CON	Ford Van	1995	Robbins AFB	GA	CNG-QVM	F150	1996	Ft. Hood	TX
CNG-CON	Ram Pickup	1991	Robbins AFB	GA	CNG-QVM	Ford Pickup	1995	Ft. Hood	TX
CNG-CON	Ram Van	1995	Robins AFB	GA	CNG-QVM	Ford Pickup	1995	Ft. Hood	TX
CNG-CON	Ram Van	1996	Argonne	IL	E85	Taurus	1995	Los Angeles	CA
CNG-CON	Chevy Pickup	1992	Crane	IN	E85	Lumina	1994	Washington	DC
CNG-CON	Chevy Pickup	1993	Crane	IN	E85	Taurus	1996	Ames	IA
CNG-CON	Dodge Pickup	1994	Crane	IN	E85	Taurus	1996	Ames	IA
CNG-CON	Ram Van	1994	Crane	IN	E85	Taurus	1996	Ames	IA
CNG-CON	Ford Pickup	1986	Baltimore	MD	E85	Taurus	1994	Des Moines	IA
CNG-CON	Chrysler Acclaim	1993	Bethesda	MD	E85	Taurus	1995	Des Moines	IA
CNG-CON	Ram Van	1993	Bethesda	MD	E85	Taurus	1993	Argonne	IL
CNG-CON	Ranger	1995	Kirtland AFB	NM	E85	Taurus	1995	Argonne	IL
CNG-CON	Chevy Pickup	1985	NAFB	NV	E85	Taurus	1995	Argonne	IL
CNG-CON	Chevy Pickup	1995	NAFB	NV	E85	Taurus	1996	Argonne	IL
CNG-CON	Chevy Pickup	1995	Nellis AFB	NV	E85	Taurus	1994	Chicago	IL
CNG-CON	Chevy Pickup	1995	Amarillo	TX	E85	Taurus	1995	Chicago	IL
CNG-CON	Chevy Pickup	1995	Amarillo	TX	E85	Taurus	1995	Chicago	IL
CNG-CON	Chevy Pickup	1987							

E85	Taurus	1996	Indianapolis	IN	GAS	Chevy Pickup	1994	Browning	MT
E85	Taurus	1996	Indianapolis	IN	GAS	Bronco	1996	Helena	MT
E85	Taurus	1995	Germantown	MD	GAS	Ram Van	1991	Helena	MT
E85	Taurus	1995	Jefferson City	MO	GAS	Taurus	1996	Omaha	NE
E85	Taurus	1995	St Louis	MO	GAS	Ford Pickup	1996	Tulsa	OK
E85	Taurus	1995	St Louis	MO	GAS	Caravan	1994	Camp Rilea	OR
E85	Taurus	1995	St Louis	MO	GAS	Chevy Pickup	1996	Amarillo	TX
E85	Taurus	1996	St Louis	MO	GAS	Ram Van	1991	Dallas	TX
E85	Taurus	1996	St Louis	MO	GAS	Spirit	1995	Crystal City	VA
E85	Taurus	1995	St. Ann	MO	GAS	Chevy Pickup	1993	Fort Belvoir	VA
E85	Taurus	1995	St. Louis	MO	GAS	Spirit	1990	Fort Belvoir	VA
E85	Taurus	1995	St. Louis	MO	GAS	Spirit	1994	Vienna	VA
E85	Taurus	1995	St. Louis	MO	M85	Spirit	1993	Burbank	CA
E85	Taurus	1995	St. Louis	MO	M85	Spirit	1993	Fresno	CA
E85	Taurus	1995	St. Louis	MO	M85	Spirit	1993	Fresno	CA
E85	Taurus	1995	St. Louis	MO	M85	Spirit	1993	Fresno	CA
E85	Taurus	1995	St. Louis	MO	M85	Spirit	1993	Fresno	CA
E85	Taurus	1996	St. Louis	MO	M85	Spirit	1994	Fresno	CA
E85	Taurus	1996	St. Louis	MO	M85	Spirit	1993	Glendale	CA
E85	Taurus	1996	St. Louis	MO	M85	Spirit	1993	Glendale	CA
E85	Taurus	1996	St. Louis	MO	M85	Spirit	1993	Goleta	CA
E85	Taurus	1996	Brooking	SD	M85	Spirit	1993	Hayward	CA
E85	Taurus	1995	Madison	WI	M85	Spirit	1993	Huntington Beach	CA
E85	Taurus	1995	Madison	WI	M85	Spirit	1993	Imperial Beach	CA
E85	Taurus	1996	Madison	WI	M85	Spirit	1993	Irvine	CA
GAS	Taurus	1996	Los Angeles	CA	M85	Spirit	1993	La Habra	CA
GAS	Bronco	1995	Putman	CA	M85	Spirit	1993	Lakewood	CA
GAS	Econoline	1996	Putman	CA	M85	Taurus	1995	Las Angeles	CA
GAS	Ford Pickup	1996	Putman	CA	M85	Spirit	1993	Loma Linda	CA
GAS	Lumina	1993	Putman	CA	M85	Spirit	1993	Long Beach	CA
GAS	Ram Van	1994	Putman	CA	M85	Spirit	1993	Long Beach	CA
GAS	Ram Van	1994	Putman	CA	M85	Spirit	1993	Los Angeles	CA
GAS	Taurus	1995	San Jose	CA	M85	Spirit	1993	Los Angeles	CA
GAS	Chevy Pickup	1992	Stockton	CA	M85	Spirit	1993	Los Angeles	CA
GAS	Caravan	1994	Golden	CO	M85	Spirit	1993	Los Angeles	CA
GAS	Ram Van	1995	Golden	CO	M85	Spirit	1993	Los Angeles	CA
GAS	Spirit	1993	Westminister	CO	M85	Spirit	1993	Los Angeles	CA
GAS	Caravan	1996	Washington	DC	M85	Spirit	1993	Los Angeles	CA
GAS	Crown Victoria	1992	Washington	DC	M85	Spirit	1993	Los Angeles	CA
GAS	Lumina	1993	Washington	DC	M85	Spirit	1993	Los Angeles	CA
GAS	Lumina	1993	Washington	DC	M85	Spirit	1993	Los Angeles	CA
GAS	Spirit	1993	Washington	DC	M85	Spirit	1993	Los Angeles	CA
GAS	Taurus	1993	Washington	DC	M85	Spirit	1993	Los Angeles	CA
GAS	Taurus	1996	Washington	DC	M85	Spirit	1993	Denver	CO
GAS	Caravan	1994	Atlanta	GA	M85	Spirit	1993	Denver	CO
GAS	Ram Van	1996	Atlanta	GA	M85	Spirit	1993	Denver	CO
GAS	Spirit	1994	Forest Park	GA	M85	Spirit	1993	Washington	DC
GAS	Caravan	1992	Tucker	GA	M85	Taurus	1995	Atlanta	GA
GAS	Ram Pickup	1993	Chicago	IL	M85	Lumina	1993	Argonne	IL
GAS	Taurus	1995	Chicago	IL	M85	Lumina	1993	Argonne	IL
GAS	Lumina	1994	Des Plaines	IL	M85	Lumina	1995	Argonne	IL
GAS	Taurus	1995	Des Plaines	IL	M85	Spirit	1994	Argonne	IL
GAS	Lumina	1995	Springfield	IL	M85	Taurus	1995	Argonne	IL
GAS	Ram Pickup	1996	Indianapolis	IN	M85	Taurus	1995	Argonne	IL
GAS	Ford Pickup	1995	Frankfort	KY	M85	Spirit	1993	Chicago	IL
GAS	Spirit	1994	Baltimore	MD	M85	Lumina	1993	Baltimore	MD
GAS	Lumina	1996	Bethesda	MD	M85	Spirit	1993	Landover	MD
GAS	Spirit	1994	Clintontownship	MI	M85	Spirit	1993	Landover	MD
GAS	Ram Pickup	1996	Rochester	MN	M85	Spirit	1995	Troy	MI
GAS	Crown Victoria	1996	Kansas City	MO	M85	Spirit	1994	St. Louis	MO
GAS	Taurus	1995	St. Louis	MO	M85	Spirit	1994	Philadelphia	PA
GAS	Taurus	1995	St. Louis	MO	M85	Spirit	1993	Vienna	VA
GAS	Caravan	1992	Billings	MT					